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TEMBER 27, 1943
UME 32, No. 20

AMERICAN
DYESTUFF REPORTER

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46 DYESTUFF CHEMICALS

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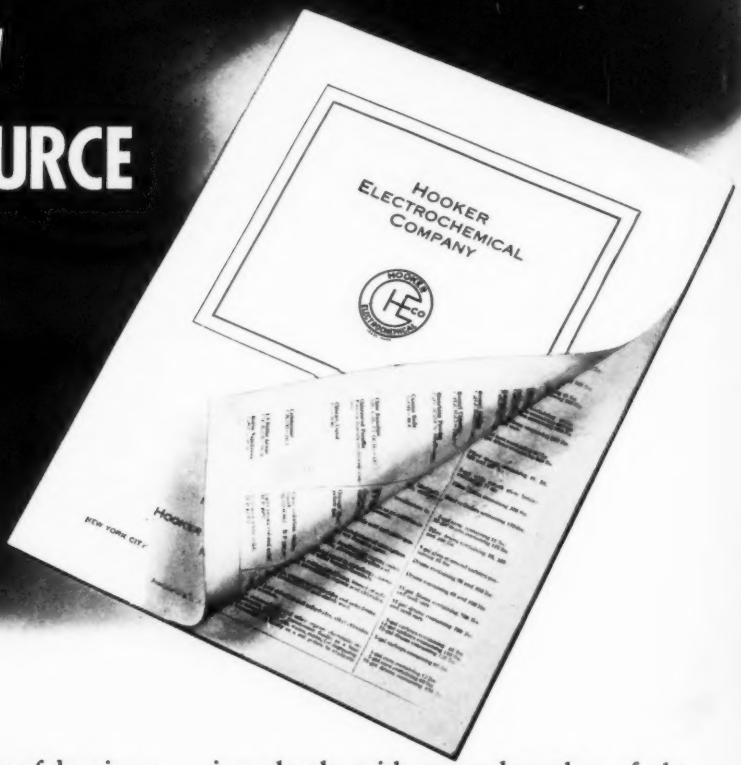

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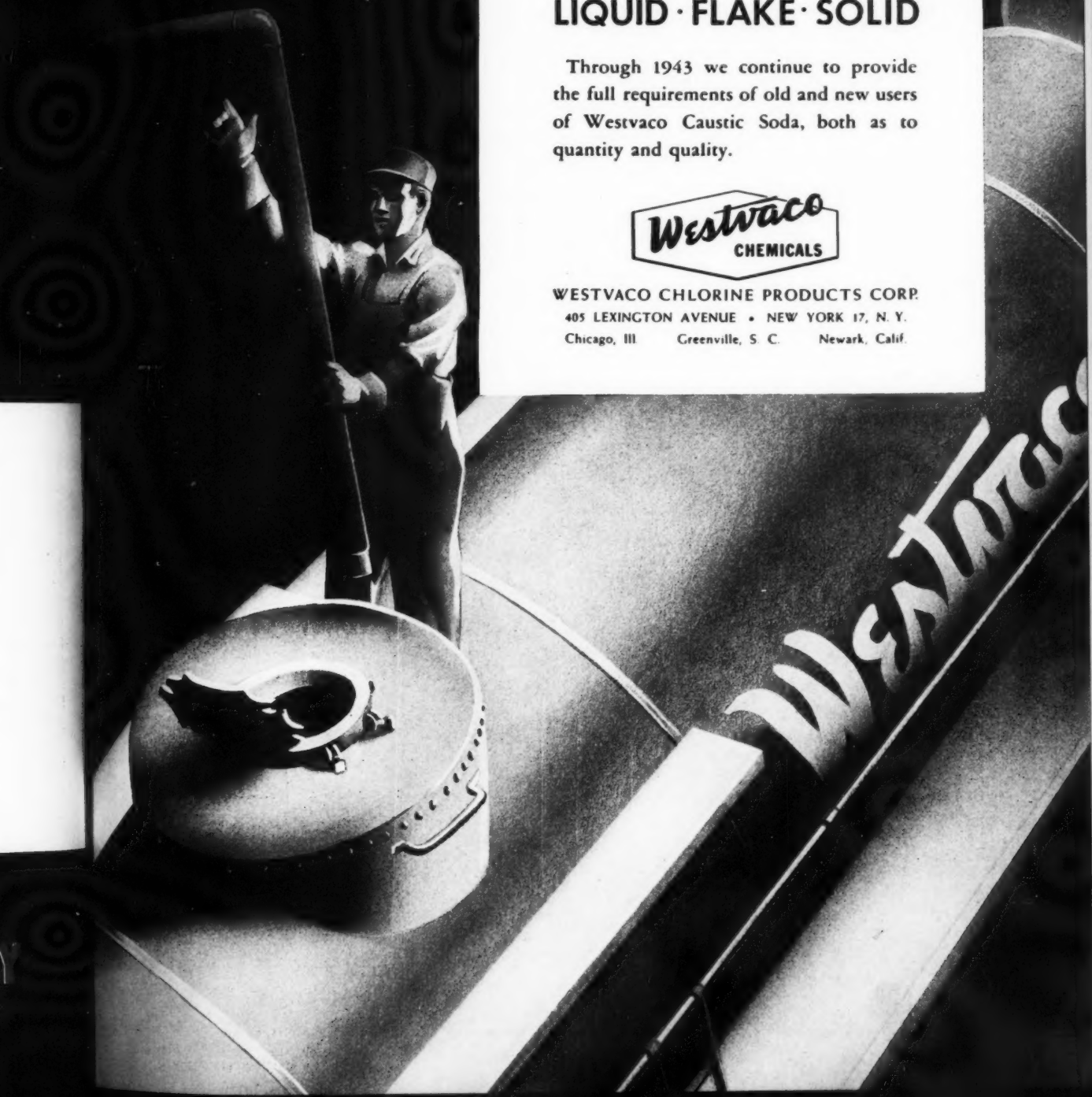

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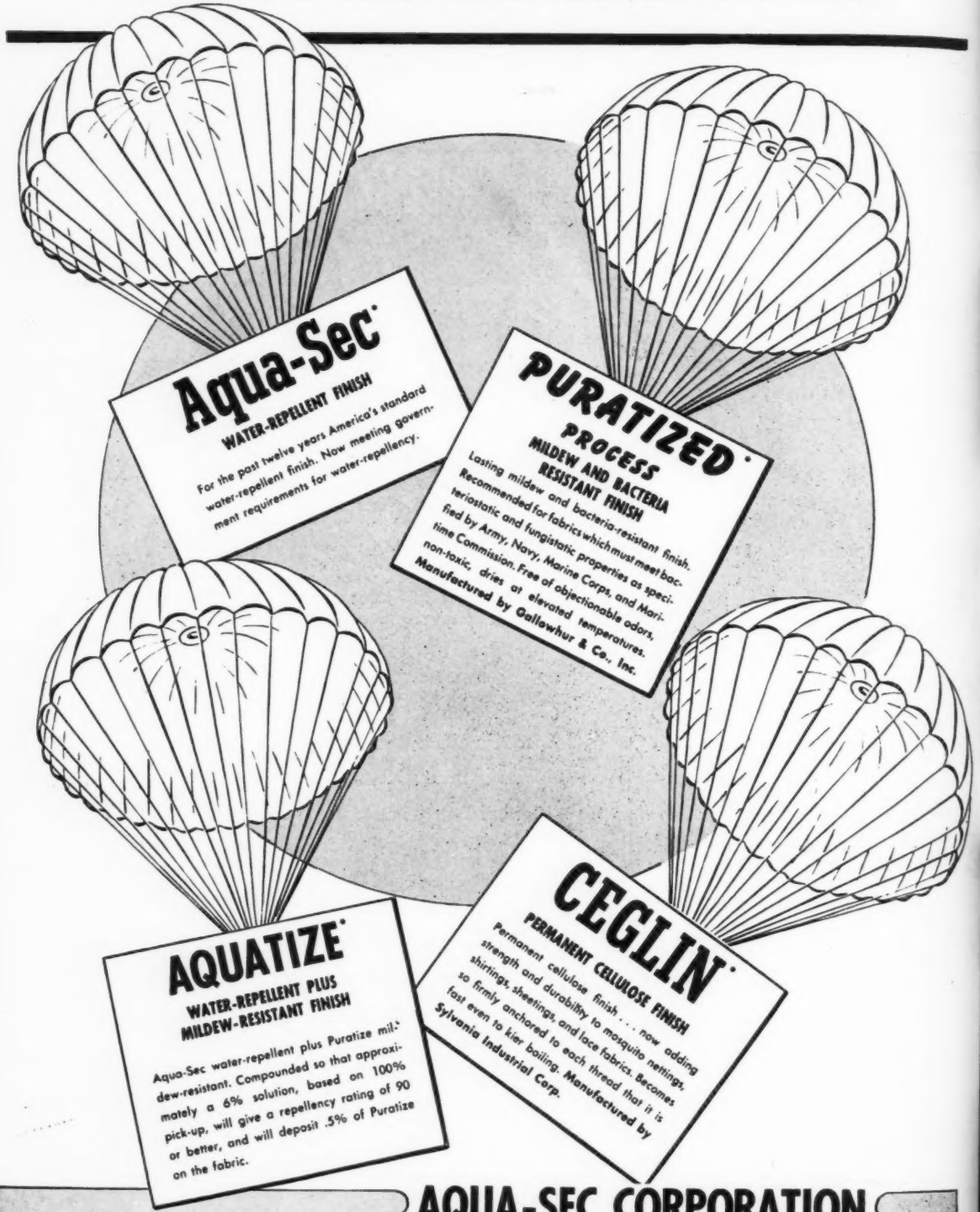
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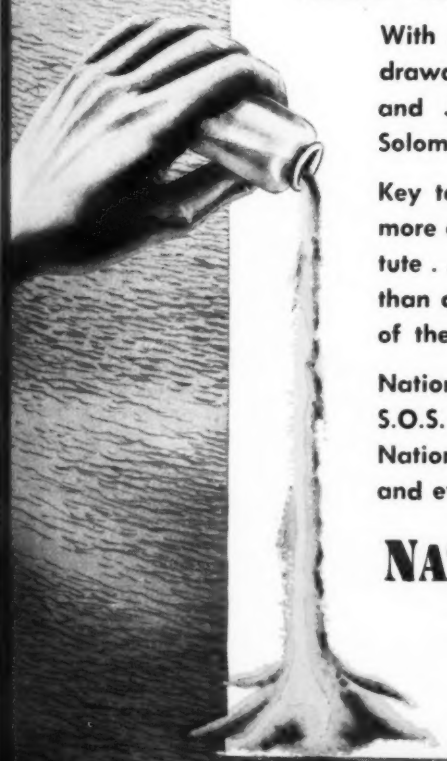

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AMERICAN
DYESTUFF REPORTER
VOLUME 32 SEPTEMBER 27, 1943 NUMBER 20

The Alkaline REDUCTION OF DYESTUFFS During Dyeing

A. CARBONE
Sandoz Chemical Works, Inc.

I—UNION DYEING

DYEHOUSE experience is rich in instances of dyeing difficulties, the explanations for which are very elusive even though the operation has been carried out with great care. The dyeing of cotton and wool and rayon and wool, as well as of cotton or rayon and mixtures of these, has often presented some baffling problems, particularly when such dyeing was conducted in closed and in pressure machines. We present here the results of our investigation concerned particularly with union dyeing.

This experimental work was done largely on wool-cotton army hose, but we believe that these observations will lead to the answer of many problems arising from union dyeing in general. We give you in detail our investigation of the dyeing of 50 per cent wool, 50 per cent cotton Army Hose, O.D. No. 9.

A laboratory match employing

Diamine Fast Blue FFB prototype 71
Chloramine Yellow type—Colour Index No. 814
and
Pyrazol Fast Orange RL

was dyed in the mill when it was found that the shade kept increasing in redness until finally it was completely out of hand.

The dyeing was carried on in a rotary machine, and after a 15-minute boil a sample was taken. The shade was slightly on the red side. The boil was continued for 15 minutes longer and a second sample taken. The shade had turned to a very reddish tan which made it necessary to set the lot aside to be put into a black.

Upon examination it was found that the stockings contained residual alkali and since dyeing was carried out in the wetting out bath to save time, this alkali was present during the dyeing. When a new batch was started therefore, 1 per cent Ammonium Sulfate was added to the dyebath along with the dyestuffs. Several additions of dyestuffs were made without encountering any further trouble and this lot was brought to shade.

Dyers employing paddle dyeing machines ran into this trouble less frequently. Ammonium Sulfate was recommended to them as a precautionary measure in the dyeing of this 50 per cent cotton, 50 per cent wool Army Hose.

In studying this case carefully, the following factors seem to be significant in bringing about this color destruction:

1—The presence of alkalinity.
2—The presence of potential reducing agents such as cellulose and wool.

Diamine Fast Blue FFB type was first investigated to determine its stability at the boil. Three samples of 250 mg. each of Diamine Fast Blue FFB type in 250 ml. of water were refluxed for three hours. The first contained no alkali, the second contained 50 mg. of Sodium Carbonate, and the third 250 mg. of Sodium Carbonate. To each, the first and second sample after refluxing and to a blank, not refluxed, were added enough Sodium Carbonate to bring the total alkali to 250 mg. in all cases. The samples were then diluted to 500 ml.; 100 ml. of each of these solutions were then used for dyeing 10 gram cotton skeins with wool attachments, using 4 per cent Ammonium Sulfate and 10 per cent common salt, and boiled for three-quarters of an hour. None of the samples showed any loss in strength or change in shade due to refluxing in water either with or without the soda ash.

In order to attempt to duplicate the result which occurred on the 50 per cent cotton, 50 per cent wool hose, the following test was made:

½% Diamine Fast Blue FFB type

was dyed on each of several skeins composed of 2½ grams cotton and 2½ grams worsted yarn. The bath was kept at 100 ml.; 10 per cent calcined Glauber's salt was used in each dyeing; a watch glass was placed over each beaker and the dyeing boiled for one-half hour.

	RESULT
No. 1—No further additions to the bath	Normal dyeing.
No. 2—1% Ammonium Sulfate	Cotton and wool slightly heavier than No. 1.
No. 3—½% Soda Ash	Cotton very light. Wool orange.
No. 4—½% Soda Ash and 1% Ammonium Sulfate	Cotton and wool heavier than No. 1.
No. 5—½% Soda Ash and ½% Calgon	Cotton slightly lighter than No. 1. Wool slightly redder.
No. 6—½% Tetrasodium Pyrophosphate	Cotton slightly heavier than No. 1. Wool very slightly redder.
No. 7—½% Tetrasodium Pyrophosphate and 1% of 100 vol. peroxide	Cotton heavier than No. 1. Wool whiter than No. 1.
No. 8—½% Sodium Chlorite	Cotton slightly heavier than No. 1. Wool whiter than No. 1.
No. 9—½% Sodium Chlorite and ½% Soda Ash	Approximately the same as No. 8.

This test shows that the most alkaline dyeing, i.e., the one containing soda ash is almost completely destroyed. It also shows that when the pH is lowered the dyeing tends to come up to the true shade, and when a small percentage of oxidizing agent is used, even though alkali be present, the destruction of color is retarded or even entirely prevented. This may be further demonstrated by the following experiment:

Three dyeings of 1 per cent Diamine Fast Blue FFB type were dyed on 2½ grams cotton and 2½ grams worsted yarn, with 10 per cent calcined Glauber's Salt, in a volume of 20:1, containing one-half per cent soda ash. The beakers were covered with a watch glass and were boiled for one hour. The first dyeing contained one-half per cent Sodium Chlorite. The second 1 per cent Sodium Chlorite and the third 2 per cent Sodium Chlorite.

After one hour's boil the dyeings were examined and it was found that the first dyeing, containing one-half per cent Sodium Chlorite, showed a slight breaking down of the color as indicated by the dyebath turning reddish. An addition of 1 per cent Sodium Chlorite and one-half per cent Soda Ash was made to this dyeing and the boil continued for another hour. After the two-hour boil the dyeings were examined and it was found that in the first dyeing the addition of Sodium Chlorite prevented any further destruction of the color, although it did not reoxidize the color that was already destroyed. Dyeings No. 2 and No. 3 showed no evidence of the dyestuff breaking down.

The following tests were made to determine the influence of temperature on the Diamine Fast Blue FFB type, when dyed with Soda Ash:

Dyeings were made on 2½ grams cotton and 2½ grams worsted yarn, in covered beakers, with one-half per cent Diamine Fast Blue FFB type, 10 per cent Calcined Glauber's Salt:

No. 1—No alkali. Dyed three-quarters of an hour at 180° F.

No. 2—½% Soda Ash. Dyed three-quarters of an hour at 180 °F.

No. 3—No alkali. Dyed three-quarters of an hour at 200° F.

No. 4—½% Soda Ash. Dyed three-quarters of an hour at 200° F.

No. 5—No alkali. Dyed at the boil.

No. 6—½% Soda Ash. Dyed for three-quarters of an hour at the boil.

All of the dyeings without Soda Ash showed no evidence of color destruction. The dyeings made at a lower temperature reserved the wool as would be expected.

No. 2 dyeing showed no evidence of color destruction.

No. 4 was slightly weaker on the cotton and much pinker on the wool.

No. 6 was only a very light blue on the cotton and a reddish brown on the wool, the color having been almost completely destroyed.

Our preliminary tests were made mostly with Diamine Fast Blue FFB type and it can be readily seen, from the following tests, that other dyestuffs are subject to the same destructive influences. In the following tests we have included a number of the frequently used direct dyestuffs, although the list is far from complete:

Method of dyeing:
1% Dyestuffs
10% Calcined Glauber's Salt
Boil 30 minutes
Volume 20:1

The dyeings were made in duplicate, on 2½ grams cotton and 2½ grams worsted yarn, one without Soda Ash and one with one-half per cent Soda Ash. All the beakers were kept covered with watch glasses during the dyeing.

We report the result as the difference observed between the dyeings without soda ash and the dyeings with soda ash. Allowance is made for the fact that the Soda Ash causes the wool to dye somewhat lighter. (See results in table on page facing).

From the above tests it can readily be seen that the tendency of these direct dyestuffs to break down is particularly prevalent in the fast to light group.

Diamine Fast Blue FFB type
Pyrazol Fast Green BL
and
Pyrazol Fast Orange 2RN

were then tested separately on 100 per cent cotton yarn, also on 100 per cent rayon yarn. The dyeing method was as follows:

10% Calcined Glauber's Salt
Boil 30 minutes
Volume 20:1
Covered beakers

No. 1—No further addition to the dyebath.
No. 2—1% Ammonium Sulfate added.
No. 3—4% Ammonium Sulfate added.
No. 4—1% Sodium Chlorite added.
No. 5—½% Soda Ash added.
No. 6—½% Soda Ash and 1% Ammonium Sulfate added.

	RESULT
Benzo Fast Yellow RL type—C.I. 349a	No appreciable change.
Benzo Fast Yellow 4GL Extra type C.I. 349	No appreciable change.
Chloramine Yellow type—C.I. 814	No appreciable change.
Pyrazol Fast Yellow 2R	Slightly redder on the cotton and wool.
Diphenyl Chrysoine G type—C.I. 631	No appreciable change.
Sun Yellow type—C.I. 620	Slightly redder.
Rosanthrene Orange R—prototype 173	No appreciable change.
Pyrazol Fast Orange 2RN	Cotton changes to reddish brown. Wool slightly yellower.
Pyrazol Orange type—C.I. 653	No appreciable change.
Pyrazol Fast Orange GX	Cotton considerably duller.
	Wool no change. Better than Diamine Fast Orange EG.
Mikado Orange type C.I. 621	No appreciable change.
Chlorantine Fast Orange TGLL—prototype 72	Cotton much duller. Wool duller and redder.
Pyrazol Fast Orange 2GL	Cotton considerably duller. Wool slightly redder.
Benzo Fast Orange S type C.I. 326	No appreciable change.
Diazo Brill. Scarlet 2BLA Extra Conc.—prototype 79	No appreciable change.
Rosanthrene Fast Bordeaux 2BL—prototype 172	Color discharged to a light pink on cotton. Wool turned yellower.
Chloramine Fast Scarlet GFL	No appreciable change.
Benzo Fast Scarlet type—C.I. 326	No appreciable change.
Pyrazol Fast Red 7BSW	Cotton discharged to a light pink. Wool turned yellow.
Pyrazol Fast Bordeaux 2BL	Cotton discharged to a light pink. Wool turned yellow.
Diamine Scarlet B type—C.I. 382	No appreciable change.
Diamine Fast Red F type—C.I. 419	No appreciable change.
Benzo Fast Scarlet type—C.I. 326	No appreciable change.
Diamine Fast Orange EG—prototype 72	Cotton considerably duller. Wood duller and redder.
Benzopurpurine 4B type—C.I. 448	No appreciable change.
Congo Corinth G type—C.I. 375	No appreciable change.
Trisulfon Brown B type—C.I. 561	No appreciable change.
Benzamine Brown 3GO type—C.I. 596	No appreciable change.
Pyrazol Fast Brown 2RL Conc.	Cotton changes to very reddish brown. Wool goes slightly redder.
Chlorantine Fast Brown BRLL—prototype 47	Cotton changes slightly redder. Wool slightly yellower.
Diamine Brown M type—C.I. 420	No appreciable change.
Pyrazol Fast Brown C	Cotton changes to a very reddish brown. Wool goes slightly redder.
Pyrazol Fast Brown R	Cotton slightly duller. Wool slightly yellower.
Congo Brown G type—C.I. 598	No appreciable change.
Benzamine Brown 3GO type—C.I. 596	No appreciable change.
Pyrazol Fast Green BL	Cotton discharges to a light yellow. Wool light yellow.
Chloramine Green B type—C.I. 589	No appreciable change.
Diamine Green B type—C.I. 593	Cotton goes yellower and much duller. Wool much yellower and weaker.
Pyrazol Fast Green 4BL	Cotton discharges to a light blue. Wool goes to a light tan.
Diazo Brill. Green 3G—prototype 78	Color almost completely discharged on cotton and wool.
Solar Blue No. 99	Slightly weaker and greener on cotton and wool.
Chloramine Copper Blue EG	No appreciable change.
Visco Blue RS New	No appreciable change.
Benzo Fast Blue FR type—C.I. 533	Much lighter on cotton and wool.
Pyrazol Fast Blue RL	Almost completely discharged on cotton. Wool reddish tan.
Benzo Fast Blue R type—C.I. 567	Cotton slightly redder. Wool considerably redder.
Visco Blue G	No appreciable change.
Diamine Sky Blue FF type—C.I. 518	Slightly heavier on cotton. Slightly yellower on the wool.
Benzo Blue RW type—C.I. 512	No appreciable change.
Benzo Blue BB type—C.I. 406	Cotton the same. Wool much greener.
Benzo Chrome Black Blue B—prototype 20	No appreciable change.
Benzo Fast Heliotrope Type—C.I. 319	Cotton discharged to a light blue. Wool duller and much weaker.
Diaminogen B type—C.I. 317	Cotton almost completely discharged. Wool orange.
Diaminogen Blue BB type—C.I. 316	Cotton almost completely discharged. Wool reddish brown.
Pyrazol Fast Violet 4BL	Cotton much lighter. Wool lighter.
Brill. Benzo Violet B—prototype 35	Cotton very much lighter. Wool nearly white.
Pyrazol Fast Violet R	Cotton very much lighter. Wool very much lighter.
Zambesi Black V—prototype 202	Cotton considerably lighter. Wool a light brown.
Columbia Black FF Extra type—C.I. 539	No appreciable change.
Benzo Fast Black L—prototype 24	Cotton lighter. Wool discharged to a light olive.
Oxydiaminogen OB—prototype 147	No appreciable change.
Plutoform Black Type—C.I. 545	No appreciable change.
Visco Black N Conc.	No appreciable change on cotton. Wool somewhat greener.
Direct Deep Black RW Extra Type C.I. 582	No appreciable change.
Diamine Black BH—C.I. 401	No appreciable change.
Pyrazol Fast Grey R	Almost completely discharged on cotton. Wool changed to a light red.

No. 7—½% Soda Ash and 4% Ammonium Sulfate added.
No. 8—½% Soda Ash and 1% Sodium Chlorite added.

The Ammonium Sulfate used in No. 2 and No. 3 did not seem to interfere in any way with the dyeing. These dyeings were slightly heavier, if anything than the control dyeing No. 1. One per cent Sodium Chlorite did not seem to influence the dyeing appreciably. The dyeing with one-half per cent Soda Ash, in the case of the cotton dyeing, was much weaker but did not show nearly as much color destruction as in the case where wool was present. The dyeings on 100 per cent viscose with Soda Ash were completely destroyed.

In dyeings No. 6 and No. 7, the addition of Ammonium Sulfate neutralizes the effect of the Soda Ash in bringing about the color destruction. In dyeings No. 4 and No. 8, the use of Sodium Chlorite also served to prevent the color

destruction, although not as effectively as in No. 6 and No. 7. This last test also clearly points out that the dyestuffs are much more easily destroyed when dyed on rayon than when they are dyed on 100 per cent cotton.

In order to demonstrate the difference between dyeing in a closed vessel and dyeing in an open vessel, the following experiment was made:

The tests were carried out on 100 per cent rayon yarn, 10 per cent Calcined Glauber's Salt, one-half per cent Soda Ash—Volume 20:1—boiled for one-half hour. Duplicate dyeings were made, one in an open beaker and one covered with a watch glass.

Solar Blue No. 99 showed considerable color destruction in the covered beaker.

Visco Copper Blue EG showed no appreciable difference in the covered beaker.

Diamine Fast Blue FFB type was completely destroyed in the covered beaker.

Zambesi Black D—prototype 201, showed no appreciable difference in the covered beaker.

Benzo Fast Black L type was completely destroyed in the covered beaker.

Pyrazol Fast Violet 4BL was completely destroyed in the covered beaker.

These tests check fairly well with the tests made on 50 per cent cotton, 50 per cent wool, and indicate the similarity in activity of rayon and wool in an alkaline dyebath.

Colors of the Sulfonine Cyanine type have always been a source of trouble which has been attributed to reducing influences. Laboratory tests have always fallen somewhat short in duplicating the results obtained in the mill. We have now been able to produce this condition at will in the laboratory and the following tests show the influence of the various agents in the dyeing of Sulfon Cyanines. The test was carried out on worsted yarn with

2% Sulfon Cyanine Extra type C.I. 289
10% Calcined Glauber's Salt,
Boiled 1 hour.
Volume 20:1, in covered beakers.

No. 1—½% Soda Ash.
No. 2—½% Soda Ash and ½% Bichrome.
No. 3—½% Soda Ash and 2% Ammonium Sulfate.
No. 4—½% Soda Ash and 4% Ammonium Sulfate.
No. 5—2% Ammonium Sulfate.
No. 6—2% Ammonium Sulfate and ½% Bichrome.
No. 7—2% Ammonium Sulfate—½% Bichrome and ½% Soda Ash.
No. 8—4% Ammonium Sulfate—½% Bichrome and ½% Soda Ash.

No. 1 was completely destroyed to a brown.
No. 2 produced a blue but duller than No. 6.
No. 3, No. 4 and No. 5 were about the same as No. 2.
No. 7 and No. 8 were about equal to No. 6 in brightness.

Sulfon Cyanine Black B type, C.I. No. 307 showed a result which was very nearly comparable to Sulfon Cyanine 5R Extra Colour Index No. 289. The same test was also applied to Nerol 2B—Colour Index No. 204. In this case No. 1 dyeing was destroyed, but did not show quite as much change as the Sulfon Cyanine Black B, Colour Index No. 307, and Sulfon Cyanine Extra, Colour Index No. 289. The No. 2 dyeing was poor, but the remainder of the dyeings did not show any great difference. It seems that Nerol 2B—Colour Index No. 204—will produce a satisfactory dyeing as long as the bath is not alkaline. However, in the case of Sulfon Cyanine Black B and Sulfon Cyanine 5R Extra, it is necessary to have a small percentage of bichrome present in order to produce a satisfactory dyeing, while a combination of bichrome and ammonium sulfate further controls the shade. If, therefore, a small percentage of ammonium sulfate is used in the dyeing, residual alkalinity will be neutralized, if present, and good duplication of formulas made possible.

CONCLUSION

Although it is beyond the scope of this paper to attempt to give a detailed explanation of the chemistry of the above tests, it seems to be fairly well established that the reaction responsible for the irregularities observed in the plant is chiefly one of alkaline reduction. By controlling the alkalinity the reduction can be inhibited. Under ordinary dyeing conditions this is best accomplished by the addition of Ammonium Sulfate. Cotton is the least active, while viscose and wool are capable of bringing about color reduction in an alkaline dyebath more readily and more completely.

The data presented shows the importance of maintaining the proper dyebath pH in order to eliminate at least one important source of union dyeing difficulties.

WHEN STARTING THAT NEW BOILER

W. F. Schaphorst, M.E.

MANY an expensive new boiler has been ruined on the very first start because of the protecting grease that was not removed. It is not uncommon for makers to cover the boiler surface with a rust preventive so that it will reach the ultimate user in tip top condition. This protecting film should be carefully removed before using the boiler, which is easily done by preparing a strong solution of soda ash and boiling it slowly in the boiler. Then drain it out. If any trace of oil still remains, flush it out with hot water. Oil in a boiler is bad because it sometimes causes bagging, and bagging may lead to failure.

If the setting is also new be sure that it is thoroughly dried out before the boiler is put to work. The best way in which to do the drying is to build a slow fire in the combustion chamber and keep that fire going until the setting is completely dry—all moisture driven out. Thus if there is oil in the boiler as mentioned above, that process of heating the soda ash solution will at the same time help to dry out the setting, thereby "killing two birds with one stone."

Start a boiler too soon, with a damp setting, and costly cracks are likely to appear. Cracks in setting are costly because they permit inleakage of air, and inleakage in turn tends to reduce the temperature of the boiler.

The Relation of the A. S. T. M. to the Textile Industry*

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THE topic which I have chosen for this address is "The Relation of the American Society for Testing Materials to the Textile Industry." It is my intention to set forth the important benefits which I believe have accrued to the textile industry during the twenty-nine years it has been served by the A.S.T.M. This means that I shall present to you a concise picture of the accomplishments of the standing committee of the Society known as Committee D-13 on Textile Materials, for it is through this committee, chiefly, that the A.S.T.M. has had its influence upon the textile industry. Do not be surprised if, in certain Society matters, my description bears a close resemblance and seems equally applicable to the standing committees of which you are members, for in reality Committee D-13's picture is very typical of many other committees in the A.S.T.M. organization.

In view of the cooperative relationships which have existed for a number of years between the American Association of Textile Chemists and Colorists and the American Society for Testing Materials we take pleasure in publishing the annual address of President Herbert J. Ball.

Professor Ball has been chairman of Committee D-13 of the A. S. T. M. for a number of years and several subcommittees of the A. A. T. C. C. have cooperated with Committee D-13 on various problems of standardization and testing.

I shall assume that my audience is composed largely of non-textile men. In order to give you an appropriate background against which to view the textile activities of the A.S.T.M., I shall quickly sketch some of the features which I believe are characteristic of the textile picture.

Let me begin by renewing your acquaintance with fibers, the fundamental raw materials of all textile products. They fall into two major classifications, natural and man-made. The important natural fibers are cotton, wool, silk, asbestos, alpaca, camel's hair, cashmere, mohair, vicuna, and those in the bast and leaf group of which flax, jute, hemp, ramie, and sisal are probably better known to you. Today a list of the commercial man-made fibers would include acetate rayon, cuprammonium rayon, viscose rayon, nylon, glass, and others derived from various resins, casein, and the soybean. What new fibers the postwar tomorrow will bring I will not attempt to predict, but that it will bring new and valuable developments in this field is undoubted.

Just a thought or two for those who are inclined to look askance at textiles as an engineering material, or who think of textiles merely in terms of wearing apparel, curtains, upholstery, sheets or other articles of common or personal use. A few illustrations of the so-called mechanical uses may be helpful at this time in making clear how textiles are engineering materials in their own right or as essential components of others: belts for transmission of power, conveyor belts, fire hose, filter cloths, brake bands, sails, tentage, thread, rope, printers' press blankets, papermakers' felts, balloons, parachutes, parachute webbing, covering of airplane wings and bodies, gas masks, tire cords, and tire fabrics. I shall cite other important uses later.

To emphasize this point further, I turn your attention to the man-made fibers previously mentioned. Here we have textile materials whose chemical and physical properties are largely determined by the producer before manufacture. In the same manner that the properties of steel are varied by changes in its chemical composition and method of production, so the producer of rayon, for example, can alter its strength, elongation, moisture content and other fundamental qualities. Fibers which are thus under the control of man's engineering genius are certainly to be classed as engineering materials, and, like their near relative, plastics, are worthy of engineering consideration alongside of steel, concrete, and other construction materials.

Some comments upon certain features of the textile industry as a whole are next in order. The entire textile industry which the A.S.T.M. serves is actually composed of many separate industries. The recognized branches or subdivisions of it are differentiated according to the textile fiber with which the group chiefly deals. Thus, for example, we commonly refer to the cotton industry, to the wool industry, or to the rope and cordage industry. The subdivisions of the textile industry are very closely analagous to the subdivisions of the ferrous metals field for which the A.S.T.M. has set up separate standing commit-

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tees under the titles of A-1 on Steel, A-2 on Wrought Iron, A-3 on Cast Iron and so on. In the case of textiles, it should be noted that one standing committee, D-13, serves the entire field.

Without entering into the details of the organization of Committee D-13, it will suffice to say that it has been developed in such a manner as to provide for every important fiber branch of the industry, for the important subdivisions within each branch, and for those functions which are of general applicability to all branches, that is, to the industry as a whole.

The textile industry has long been a traditional one. Only in comparatively recent years has the value of research and of the scientific approach to the problems of manufacturing and merchandising been generally realized by a substantial part of the industry. This changed attitude has resulted in the increased employment of technically trained personnel, and, in very large measure, these are the men and women who have been actively engaged in advancing the standardization activities with which we are presently concerned. It can be said that the industry is now emerging from the doldrums of tradition and taking its place with other progressive industries.

A textile man will recognize that the foregoing is far from a complete discussion of each topic. For the non-textile person, however, I trust it has been sufficiently adequate to provide a suitable background against which to view the general standarization problems of the industry and to make for a better understanding of what has been done in this field.

How widely interest in the standardization program has spread to the textile and to associated industries can be determined in part by a scrutiny of the business connections of those engaged in the work. It will be found that in each fiber branch there are representatives from all the larger producers of yarns and fabrics, and in most instances from their respective national associations. The producer group also includes the names of all units of the chemical industry which produce rayon fiber. Consumer interests are represented by large mail-order and chain store organizations, large retail stores, wholesalers and distributors, a national purchasing organization, consumer advisory groups, well-known tire and rubber companies, manufacturers of electrical equipment, wire manufacturers, and railroads. The general interest group includes those from government departments and bureaus of the United States and Canada, commercial testing organizations, colleges, technical schools, builders of testing equipment, and manufacturers of soaps, dyestuffs, and finishing agents.

One direct measure of the magnitude of the standardization activities is to be found in the 78 textile standards that are now on the books of the A.S.T.M. The indirect and equally valuable effects of the years of work, meetings, inter-laboratory tests, and discussions are difficult of reduction to a common denominator, but that they have been very great and influential will hardly be denied.

I do not propose to bore you with a lengthy examination of each of these standards but, on the contrary, will cite such illustrations as will make clear their importance, utility, or the progress they denote. In 1914, when the A.S.T.M. authorized the formation of the textile committee, methods of test were in a chaotic condition. This was particularly true, for example, of the breaking strength test where size of test specimen, type of clamps, and speed of pulling clamp differed with the individual thinking at any one mill. Furthermore, the mills tested their products under the atmospheric conditions prevailing in the spinning or weaving rooms, office or basement, wherever the testing equipment happened to be located. The standardization of this test and its technique was obviously one of the first requisites if comparable test results between producer and consumer were to be obtained. The results of the studies made at that time have come down to us today in the widely accepted standard requirements for the grab and raveled strip test specimens, for standard atmospheric conditions for testing laboratories, and for strength testing machines and the details of their operation.

Other standards, developed later, and also of general applicability to and acceptance by the entire industry are those for bursting strength testers, for twist testers, for the dead weight gauge for thickness measurements, the method of determination of twist in yarns, of identification of fibers in mixtures, of color fastness of colored textiles to light, the fundamental textile definitions, and the S and Z nomenclature for designation of direction of twist. This latter item has in fact become an international standard through adoption by the International Standards Association Committee 38 on Textiles. The above-mentioned standards alone have unquestionably had a marked influence upon the manufacturing, sales and testing activities of every important producer and consumer in the entire textile field.

Each separate branch of the industry has naturally felt the influence of the particular standards prepared for its own needs by its own representatives. In evaluating this effect, it must be remembered that the cotton industry is the largest of all. Its annual output is measured in billions of pounds and on this basis is larger than all the other fiber groups combined. This industry has been provided with methods of test for cotton in all its important forms, namely, fiber, yarn, thread, the many mechanical fabrics ranging in weight from light to heavy, and those fabrics which enter so largely into the ultimate consumer field. With the cooperation of the U. S. Department of Agriculture, a set of appearance standards has been developed for the purpose of grading cotton yarns for certain qualities which can be determined by visual examination. These have been found to be very useful and have been well-accepted.

The rubber tire industry was the first and has always been one of the most active in the promulgation of standards for cotton textiles and more recently for rayons. This work has so far advanced that tire textiles are now produced to meet rigid specifications for strength, elonga-

tion, twist, weight, and thickness. Inadequacies in these properties are directly reflected in the quality of the tires produced from them, and ultimately in the safety of those who ride on them. This industry quite generally writes into its purchase specifications the A.S.T.M. methods of test, and it has been indicated that the Society's material specifications for tire textiles have resulted in a reduction in the variety of fabrics used in the industry.

The woolen and worsted industry had practically no technical standards until they were supplied through the activity of the wool group of Committee D-13, beginning about twelve years ago. The energy and diligence of this group has now given the industry standard methods of test for the material in the form of fiber, woolen yarns, worsted yarns, mixture yarns, wool and part wool fabrics, and felt. The test for fineness of wool tops has substituted a scientific procedure for one in which the personal equation previously predominated, has resulted in the setting of grade standards, and has given the industry a tool of great value in settling fairly disputes with government agencies about the grades of grease or scoured wools. The test has been made the basis for the grading of tops by the Wool Associates of the New York Cotton Exchange, has received official recognition by the U. S. Department of Agriculture, and is employed by the Army and Navy to determine the grade of wool in fabrics.

Working in close cooperation with the U. S. Treasury Department, there has been developed, as an A.S.T.M. standard, a new method of estimating hard scoured wool in wool in the grease. This represents a solution of an old and difficult problem of determining wool shrinkage in connection with tariffs and duties. The method is now daily routine work at the U. S. Customs Laboratory in Boston. As another illustration of cooperation, I shall cite the present work on the establishment of grades for the coarser wools. The groups represented are the Boston wool trade, the Philadelphia wool trade, the carpet industry, the felt industry, the National Association of Wool Manufacturers, the U. S. Department of Agriculture, and the U. S. Treasury Department. It is only natural that A. S. T. M. standards developed by such cooperative approach should be highly authoritative in the industry concerned.

The requirements of the automotive industry as large buyers of wool felt have stimulated interest in this material by the wool group. The result is a carefully drawn set of physical and chemical test methods for this important textile.

Members from the rug and carpet industry have provided it with a comprehensive set of methods of test of pile floor covering which is now the guide of that industry. This has come about because its research and testing engineers could meet in the technical atmosphere of Committee D-13 to operate on matters affecting the welfare of the industry as a whole, without having to consider personal and competitive conditions. Under such auspices the units of this industry have found it possible to unite in an extensive wear test program, in cooperation with the National Bureau of Standards, from the results of which it is hoped to standardize on the ultimate wear of pile floor coverings.

Standardization activity in the rug and carpet field has spread to the jute industry because the latter is the supplier of one of the important materials entering into the construction of floor coverings. The representatives of the jute industry have set up referee methods of test for four important types of its products whereby buyer and seller can refer disputed deliveries to a neutral competent technician, and decision may be reached by comparing test results with purchase agreements. The inclusion of these methods in the purchase specifications of nonmembers is not only gratifying but indicates that the standards are filling a need.

The glass fiber industry, the latest group to join in the activities of the Textile Committee, has already developed standard methods of test and tolerances for glass fabrics, tapes, sleeving and yarn, together with definitions of pertinent terms. It has had the advantages which come from the initiation of standardization work soon after glass fiber products were in commercial production. There was also available to it all of the fundamentals regarding testing conditions and machines which had been developed for other textile products. These were incorporated with little or no change for testing glass textiles.

Manufacturers of electrical equipment are important consumers of quantities of textile materials for insulating purposes. These take the forms of roving, yarn, sheeting, duck, tape, tubular sleeving, and braid and are made of cotton, rayon, silk, jute, asbestos or glass. Representatives of the producers and consumers have worked out satisfactory methods of test for each of the above textile products to determine their suitability for insulating electrical conductors. These standards have been of particular benefit to the asbestos industry. Prior to their adoption, individual manufacturers of electrical apparatus had separate specifications and methods of test which not only differed but which placed a hardship on the supplier by requiring rather complete and unnecessarily burdensome test apparatus.

The rayon industry has developed all of its important standardization work under A.S.T.M. auspices. Three standards cover the entire rayon yarn field, one dealing with filament rayon, one with rayon staple, and the other with yarns and threads made from the staple fiber. The extent to which the effect of the methods of test found in these standards permeates the whole textile industry will be better conceived when one recalls the phenomenal expansion which has occurred in the past fifteen to twenty years in the use of this material and which has made it the second largest branch of the textile industry measured on the basis of poundage output. Cotton, woolen, worsted, and silk manufacturers, as well as the knit goods industry, are consumers of enormous quantities of rayon to be turned into yarns and fabrics made wholly of rayon or in combination with the other fibers. The advantages which

come from having the various fiber groups working under a common banner is further evidenced in the rayon staple fiber field. It is found that the methods developed by the cotton and wool groups for the sampling and determination of length of cotton and wool fibers, respectively, are quite adaptable to the various class lengths of rayon staple. It should be noted that the Federal Trade Commission in its rules for the rayon industry has adopted the A.S.T.M. definition of rayon. The rayon manufacturers, weavers, and government agencies now regularly employ the rayon standards in the development and inspection of rayon fabrics for ordnance and aircraft use, particularly in high-strength automobile, truck, and aircraft tires, and in balloons and parachutes.

Large quantities of fabrics are finally converted into a wide variety of articles to satisfy the needs and desires of the so-called ultimate consumer. Interest in textile commodities of this type has shown a rapid increase in recent years as a result of the educational work, particularly among women, by the departments of home economics in the colleges, by state and national bureaus, and by various consumer organizations. This demand for more information about textiles is ultimately reflected in statements on tags or labels regarding such properties as strength, weight, construction, color fastness, and fiber content. Determination or verification of such facts raises the question of reliable test methods and specifications and this is work for the A.S.T.M. In recognition of this, Committee D-13 has organized a group whose function is the preparation of standards for household and garment fabrics. It has done this in the belief that this offers to the textile industry and to those who are closest to the consuming public the most logical meeting place wherein to work out the best compromise standards, practical in their requirements and fair alike to both interests. The results to date are tentative specifications for five fabrics, namely, broadcloth, sheeting, terry toweling, corduroy, and blanketing. It will be noted that these deal with the material out of which the ultimate consumer goods are made. It is not the intention to deal with the final articles themselves.

The Textile Committee has realized the need for a better understanding of the relations between sampling procedures and the proper number of tests it should specify in its standards. The group which it organized to take over the problems connected with sampling and interpretation of data is doing a most excellent piece of educational work. As a result there has already been set up a definite procedure for the use of the subcommittees when it is desired to specify the number of tests necessary to determine the average quality of a lot or shipment of a textile material with respect to an individual quality characteristic. It is also to be used when it is desired to fix the sample size on the basis of an allowable error of the average and for a chosen probability. It is adaptable for use by individual manufacturers and consumers in developing company standards or specifications. It is not surprising, therefore, that a textile standard is the first Society standard to have incorporated in it a statement regarding the expected precision of a test result. The entire program has undoubtedly been largely instrumental in making the textile industry conscious of the need for and value of statistical control.

Other benefits have accrued besides those industry-wide ones previously mentioned, and the committee's standards have been used to advantage in many ways by individual units in the industry. Disagreements between buyer and seller, and customers' complaints as to quality are frequently settled by use of the A.S.T.M. textile standards in recognition of their fair, reliable, unbiased, and authoritative character. Definite reference to them in purchase contracts has tended to preclude controversy and litigation, and to eliminate losses and delays through possible misunderstandings and misinterpretations.

The standards have served as guide posts to the commercial testing organizations in fulfilling the many and varied requirements their work entails. The compilation of textile standards, a book containing all the Society's standards relating to textile materials, is found to be a handy ready reference manual in most textile testing laboratories, and is used extensively as the text book in classes in textile testing in the schools and colleges. By the committee's work, testing machine builders have been stimulated to develop new and better pieces of testing apparatus, and the fact that a piece conforms to an A.S.T.M. requirement is regarded as a mark of approval and distinction. Mill research laboratories have recognized that the textile standards may be employed as an effective means for securing reliable processing control. Some smaller units have been spared the expense of developing laboratory methods of their own and have eliminated much time-consuming controversy within the four walls of their plant by reference to the standards. The use of standard test methods between mills, brokers, selling houses, and the consumer assures a better comparability of test results as the properties of a material are evaluated by each interested handler along the channel of distribution.

The meetings of Committe D-13 have become one of the most important clearing houses for the exchange of technical information of value to the industry as a whole. Producer, consumer, and general interest members seem very willing to make their contribution to the advancement of the knowledge of textile materials and their properties. Papers presented before the committee as a whole and at the meetings of its sub-groups offer the very newest in facts, techniques, and developments. This has permitted a coordination, between the divisions of the industry, of the attack on problems of related interest, and has undoubtedly been effective in speeding up research work in individual companies. Into these papers and resulting discussions are poured the great wealth of accumulated experience and new knowledge possessed by representatives of government bureaus and departments, by experts and technicians in the research, developmental, and testing laboratories of

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SEPTEMBER 27, 1943

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Carmelo R. Puliafico, Chairman; Paul J. Martin, Secretary

North Carolina State College Student Chapter

William R. Ivey, Jr., Chairman; James F. McAlister, Secretary

Philadelphia Textile Institute Student Chapter

F. J. Lorent, Chairman; S. M. Suchecki, Secretary

New Bedford Textile School Student Chapter

Helen E. Brooks, Chairman; Charles T. Allen, Jr., Secretary

Members should notify the **Secretary** immediately of all address changes.

MEETING, SOUTH CENTRAL SECTION

THE September meeting of the South Central Section was held Friday evening, September 10th, 1943, at the Read House in Chattanooga, Tennessee.

Dinner was served at 7:00 P. M. and attended by sixty-five guests and members.

The speaker for the evening was T. A. Printon, Vice President of the National Oil Products Co. of Harrison, New Jersey. He gave an interesting talk on, "Business Problems of Today, and Post War Possibilities."

Another feature of the meeting was the splendid response from the question and answer program. Jack Anderson led the discussion on the dyehouse problems.

The chairman appointed Marvin H. Moore, Wm. J. Kelly, Jr., and Nester H. Grotelueschen to check the possibilities of new corporate members. He also appointed a committee to raise funds for the expense of a speaker to deliver our paper at the Intersectional Contest in New York. The committee consists of:

William A. Bentel, F. F. Myers, Wm. S. McNab and Malcolm Mackenzie.

The next meeting will be the regular meeting for election of officers and the chairman appointed a nomination committee consisting of:

H. A. Rogers, Walter E. Hadley, Wm. S. McNab and Homer Whelchel.

Respectfully submitted

HOMER WHELCHEL, *Secretary.*

MEETING DATES, NEW YORK SECTION

AT a recent meeting of the Technical Program Committee of the New York Section, the following dates were selected for meetings during the 1943-44 season: October 22, 1943 (Intersectional Contest); December 3, 1943; February 4, 1944; April 7, 1944; and May 19, 1944.

MEETING DATES, PHILADELPHIA SECTION

MEETINGS of the Philadelphia Section are expected to be held at the Hotel Philadelphian, Philadelphia, Pa., on the following Friday evenings: October 29, 1943; December 10, 1943; January 14, 1944; March 3, 1944 and April 14, 1944.

CORPORATE MEMBERSHIP COMMITTEE, NEW YORK SECTION

PATRICK J. KENNEDY, chairman of the New York Section, has announced the appointment of the Corporate Membership Committee under the chairmanship of Leonard S. Little. Mr. Little is manager of the Textile Service Section, Organic Chemicals Department, E. I. duPont de Nemours & Co., Inc., and has been a prominent figure in the textile industry for many years. Just previous to joining duPont he was president and general manager of the U. S. Finishing Co. and its subsidiaries and had formerly served in an executive and managerial capacity with a number of mills and finishing companies including Slatersville, Bancroft, Pacific and Apponaug. He started the Lyman, S. C., plant of Pacific Mills and managed it for a number of years. Serving on Mr. Little's committee are:

Leonard S. Little

George L. Baxter, Bradford Dyeing Association; Carl Z. Draves, General Dyestuff Corp.; W. F. Macia, A. M. Tenney Associates; A. J. Royce, Royce Chemical Co.

• CALENDAR • OF COMING EVENTS

Meeting, Mid-West Section, Bismarck Hotel, Chicago, Illinois, October 16, 1943.

Intersectional Contest, in conjunction with New York Section Meeting, Downtown Athletic Club, New York City, October 22, 1943.

Council Meeting, New York City, October 22, 1943

Meeting, Philadelphia Section, Hotel Philadelphian, Philadelphia, Pa., October 29, 1943.

Meeting, Southeastern Section, Atlanta Athletic Club, Atlanta, Ga., December 4, 1943.

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the American Dyestuff Reporter any vacancies which may occur in their business.

NOTICE TO EMPLOYERS

Personal Histories and Employment Records of the following applicants are on file at the office of the American Dyestuff Reporter. Prospective employers may examine them without obligation.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE AMERICAN DYESTUFF REPORTER AT ONCE.

A-2

Education—Graduate, Lowell Textile Institute, B.T.C., 1933.
Experience—Experienced as textile chemist, chemist-spotter, agricultural chemist and U. S. Army inspector on cotton, rayon, woolens and worsteds. Seeks research or control position with future. New England preferred.
Age 34; married; references.

A-3

Education—B.S. in chemistry, Lehigh University.
Experience—Experimental engineer and analytical chemist, 8 mos.; assistant superintendent of silk corporation, assisted in planning and directing production, in charge of laboratory, technical work, personnel, purchasing, etc., 2 years; inspector of ordnance material, to the present. Seeks position as chemical engineer or chemist.
Age 26; single; references.

A-B-C-F-3

Education—High school and full apprenticeship.
Experience—Practical Dyer and finisher. Long experience on specialties for men's wear trouser trade in cottons, cotton and rayon mixtures and cotton and Celanese. Is disposing of interests in progressive finishing plant and seeks position as manager, assistant manager or technical advisor. Thoroughly understands requirements of Quartermaster, especially on herringbone constructions.

C-1

Experience—Experienced as assistant finisher, finisher and superintendent of finishing since 1923. Experience on automobile cloth, boucle overcoatings, high grade men's wear worsted, low grade woolens, medium grade plaid-back overcoatings, fleece finish overcoatings. Bolivias, kerseys, medium-grade men's piece dye suitings, uniform cloth, flannels, ladies' dress goods and coatings, government serge and elastique fabrics, marine wool, flannel shirtings.
Age 37; married, 3 children; references.

C-2

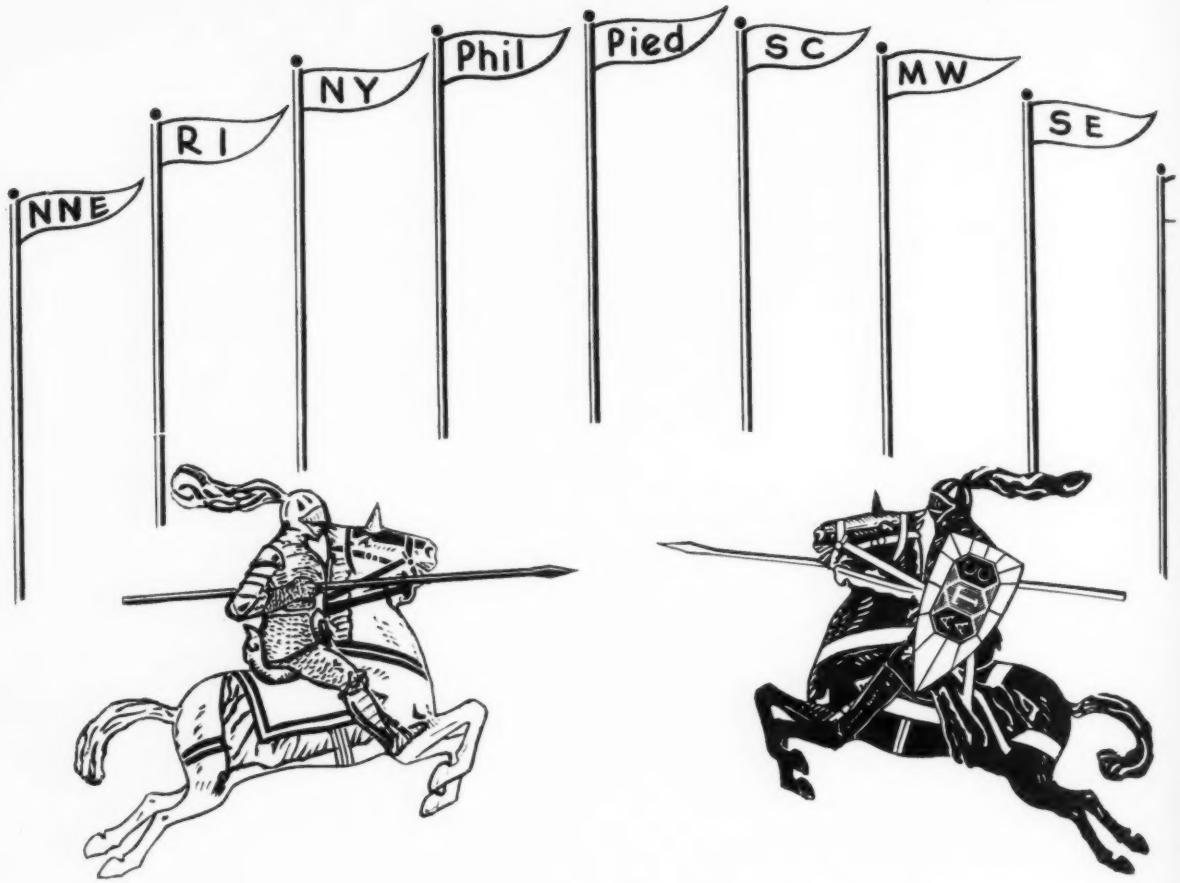
Education—Completed course in textile engineering and chemistry except for final half-year at Clemson College.
Experience—11 years of experience in finishing operations, including 8 years as overseer. Experienced on all types of cotton cloths. Experienced on pure finishes, backfilling, Sanforizing, pre-shrinking, and application of several types of water repellent finishes. Seeks position as overseer of finishing department.
Age 32; married; references.

D-1

Education—Graduate of Germantown Academy; two years training in business management and mathematics; two years in dyeing and chemistry at Philadelphia Textile School.
Experience—15 years' experience as a dyer in various concerns; 5 years' experience selling dyestuffs; 2 years' experience as technician and salesman demonstrating mildew-, water- and fireproofing compounds. Familiar with quartermaster and engineer specifications.
Seeks position in sales department, demonstrating dyes, oils or finishers.
Age 45; married; references.

MEMBERSHIP
APPLICATION BLANKS
for individual
and corporate
MEMBERSHIP
may be obtained
from the secretary

Dr. H. C. CHAPIN
Lowell Textile Institute, Lowell, Mass.



FOURTH ANNUAL

Intersectional Contest

(In conjunction with New York Section meeting)

Downtown Athletic Club, 19 West St., New York, N. Y.

OCTOBER 22, 1943

NOTICE TO MEMBERS OUTSIDE THE NEW YORK SECTION

Members of the Association, other than the New York Section, who plan to attend the dinner preceding the Intersectional Contest, should send their reservations to reach Norman A. Johnson, American Dyestuff Reporter, 440 Fourth Avenue, New York 16, N. Y., no later than October 19th. Due to war-time restrictions, no dinner can be served without a reservation. The dinner attendance will be limited to the dining room capacity. Members of the New York Section will receive information in the regular meeting notice as to the method of making reservations.

Deterioration of FLAMEPROOFED COTTON FABRIC*

Results of Investigations to Determine the Comparative Deterioration, in Terms of Tensile Strength Losses and Chemical Damage, Produced in Cotton Fabrics by the Use of Certain Soluble Flame-proofing Agents

AUBREY S. TWEEDIE and C. H. BAYLEY
National Research Council Laboratories, Ottawa

THERE has recently been considerable interest in the so-called "permanent" types of newly developed flameproofing agents which are not removed by the action of water. Materials of this type include chlorinated paraffins, chlorinated naphthalenes and vinyl chlorides, their flame-inhibiting characteristics depending upon their ability when heated to release chlorine-containing gases which do not support combustion.

However, the fact remains that the use of compounds of this type in the flameproofing of clothing is not yet widespread, and the older types of water-soluble flameproofers are still the most widely used. This class of flameproofers includes such salts as borax or boric acid and their mixtures, ammonium sulfate, ammonium phosphates and, more recently, derivatives of sulfamic acid such as ammonium sulfamate, and the use of these compounds in the flameproofing of industrial garments such as clothing worn by munitions workers is becoming fairly widespread.

The use of water-soluble flameproofers on clothing which has to be laundered necessitates the reapplication of the compound at the end of each laundering treatment. The compound is usually applied in the last rinse and the garments centrifuged and hot pressed, the strength of the solution used and the time of centrifuging being so chosen as to assure the requisite percentage of flameproofer in the dried fabric.

Since the process is repeatedly used with a given garment, it was of interest to determine whether there was evidence of appreciable deterioration resulting from the repeated use of the commoner water-soluble flameproofers. Since cotton garments and fabric form the bulk of textiles receiving flameproofing treatments, the data reported in this paper applies to cotton.

MATERIALS USED

Cotton Fabric—A special grade of light cotton sheeting ("Tarantulle" nainsook) obtained from Messrs. Tootal, Broadhurst, Lee and Company, Manchester, England, was used. It is the fabric used by the Laundry Research Laboratory to the National Research Council in laundry "test bundles."

The thread count of the fabric is 97 x 98, weight 2.6 ounces per square yard, and warp tensile strength approximately 45 pounds. It is a fully and evenly bleached fabric showing a low cuprammonium fluidity of 3 to 4.5. In twenty standard commercial launderings in a white-work classification the warp tensile strength loss is from 3 per cent to 7 per cent, and the increase in cuprammonium fluidity from 3 to 5 reciprocal poises.

Portions of fabric 24 inches along the warp and 16 inches along the weft were marked off into two equal portions. Each portion was subjected to the successive treatments described below, pieces being cut off after 5 and 10 treatments and measurements of warp tensile strength and cuprammonium fluidity carried out.

FLAMEPROOFING AGENTS

The following proportions by weight of commercial grade of flameproofing agents were dissolved in 100 parts by weight of tap water to give the working solution:—

1. Borax 7, boric acid 3
2. Borax 7, boric acid 3, ammonium sulfate 5
3. Borax 7, boric acid 3, ammonium dihydrogen phosphate 5
4. Ammonium sulfate 10
5. Ammonium dihydrogen phosphate 10
6. Ammonium sulfamate 10

METHOD OF TREATMENT

The cotton fabric used was well rinsed in water and dried. It was then soaked for 5 minutes in the impregnating solution with frequent squeezing. It was next placed in a small centrifuge, the power turned on and the machine run for 15 seconds, the power then turned off and the centrifuge allowed to coast to a stop in 15 seconds. This gave wet retentions of solution of approximately 100 per cent.

The sample was ironed on a flat-bed General Electric household press for 20 seconds at a temperature of 275° C to 300° C. Care was taken to avoid contamination of the sample with traces of impregnating salts remaining in the press cloth or on the metal head of the press. A fresh press cloth was used with each sample and the metal head of the press was well washed off between pressings. The centrifuge was well washed between runs. Before each successive treatment with a given impregnant, the sample was freed from impregnant by washing and drying.

*Canadian Textile Journal.

TESTING OF IMPREGNATED FABRICS AFTER HOT PRESSING

Tensile Strength—The standard one-inch ravelled strip method was used[1]. All samples were conditioned at 65 per cent Relative Humidity and 70° F for 24 hours before testing.

Cuprammonium Fluidity—The method used[2] was the one developed at the British Cotton Industries Research Association[3]. The samples were washed free of impregnant dried and conditioned at 65 per cent Relative Humidity and 70° F prior to weighing.

EFFECT OF SUCCESSIVE IMPREGNATION AND HOT PRESSING

The effect on warp tensile strength of successive impregnations with the various flameproofing agents, with intermediate washing, is given in Table I.

The effect of the treatments on the cuprammonium fluidities of the various samples, expressed as reciprocal poises, is given in Table II.

TABLE I

Impregnant	Warp Tens. Str. (lb.)* After 5 treatments	Warp Tens. Str. (lb.)* After 10 treatments	Loss (%) After 5 treatments	Loss (%) After 10 treatments
Water	43.9	42.7	0.2	2.9
1. Borax—boric acid	42.9	41.4	2.5	5.7
2. Borax—boric acid—ammonium sulfate	38.9	34.7	11.6	21.1
3. Borax—boric acid—ammonium dihydrogen phosphate	42.2	40.8	4.5	7.3
4. Ammonium sulfate	28.5	19.7	35.2	55.2
5. Ammonium dihydrogen phosphate	34.6	22.9	21.3	47.9
6. Ammonium sulfamate	29.3	22.8	33.4	48.2

*Original warp tensile strength = 44.0 lb.

TABLE II

Impregnant	Fluidity* (reciprocal poises) After 5 treatments	Fluidity* (reciprocal poises) After 10 treatments	Increase in Fluidity After 5 treatments	Increase in Fluidity After 10 treatments
Water	4.8	5.9	0.3	1.4
1. Borax—boric acid	4.8	5.7	0.3	1.2
2. Borax—boric acid—ammonium sulfate	9.8	13.5	5.3	9.0
3. Borax—boric acid—ammonium dihydrogen phosphate	6.2	7.2	1.7	2.7
4. Ammonium sulfate	15.3	22.1	10.8	17.6
5. Ammonium dihydrogen phosphate	12.8	19.1	8.3	14.6
6. Ammonium sulfamate	13.6	20.1	9.1	16.0

*Original fluidity — 4.5.

DISCUSSION

It will be noted that all of the flameproofing agents investigated resulted in measurable tensile strength losses at the end of ten treatments. The increase in fluidity also indicated that chemical damage had occurred in all cases. Borax—boric acid mixture gave the least indication of damage, while the damage was greatest in the case of ammonium sulfate. The order of the impregnants used, in ascending order of damage, is 1, 3, 2, 5, 6, 4.

With respect to the borax—boric acid treatment, it is of interest to note that the actual dry retention is only approximately two thirds of the theoretical dry retention calculated from a given strength of solution and a given wet pick-up. This appears to be due to the formation of a borax—boric acid complex which has a substantially lower degree of hydration than the original borax and boric acid used.

REFERENCES

(1) Method IX, Schedule 4-PG-2, "Methods of Testing Textiles," of the Canadian Government Purchasing Standards Committee.
(2) Method XVII, ibid.
(3) Clibbens, D. A., and Little, A. H., Shirley Institute Memoirs, Volume 15 (1936), p. 25.

A.S.T.M.—

(*Concluded from page 422*)

large industrial plants and consumer establishments, and by those inspired to research in textiles in the schools and colleges throughout the country. The wide representation of interests and the substantial body of scientific men and women which are brought together at its meetings affords an unexcelled opportunity to broaden one's knowledge, and the contacts made with the minds of others lead to intellectual growth and professional maturity.

It is very clear that the textile industry recognizes in the A.S.T.M. a central organization, covering the entire fiber field, and doing practical, scientific standardization work of the broadest scope. The continuous increase in members from this industry is excellent evidence of the Society's importance to the industry which it serves. Under its auspices producers and consumers meet on neutral ground and in a technical atmosphere, acquire a mutual respect for the other's difficulties, and then cooperate in the solution of their common problems. It is highly essential to the industry that those who are most experienced in and who have intimate contact with the standardization work of their irrespective organizations should serve in the development of the Society's standards. To this end, the A.S.T.M. invites the continued support of the industry through membership of its qualified men and women.

The quality of the standards which the textile industry has prepared for itself, coupled with the prestige and the sensible requirements of the A.S.T.M., has placed them in an authoritative position in the industry. This position must not be impaired one iota. Those who put faith in the integrity and scientific character of our work must not have that confidence shaken or violated. To see that the standards shall be reliable, unbiased, practical, technically correct, and comprehensive, must be the standard upon which the eyes of its officers and committee chairmen are constantly focused. Under such conditions the textile industry will continue to accept the leadership of the A.S.T.M. in the standardization field, and its influence will become even more widespread and effective as the years roll by.

OBITUARY

EARL V. PATNAUDE

AVIATION CADET EARL V. PATNAUDE, 24, formerly a chemist of the Laboratory Division of Warwick Mills, Boston, Massachusetts, was killed in a plane crash August 19, 1943 near Moore Field, Mission, Texas. He was to have been graduated August 30 with the rank of second lieutenant in the Army Air Forces.

Cadet Patnaude was born in New Bedford, Massachusetts, and was a graduate of the High School there and of New Bedford Textile School. He enlisted in the Army in March 1942 and, after a period in Chemical Warfare Service, shifted to the Army Air Forces.

He was a member of the Northern New England Section of the American Association of Textile Chemists and Colorists.

In addition to his parents, Mr. and Mrs. Joseph C. Patnaude, formerly of New Bedford but now of Manchester, New Hampshire, Cadet Patnaude is survived by a brother, Private First Class Raymond M. Patnaude, somewhere in the Pacific. Joseph C. Patnaude is employed at Amoskeag Fabrics, Inc., Manchester, New Hampshire.

• APPOINTED DEAN

Malcolm E. Campbell, research manager of the Textile Research Institute, Inc., has been appointed dean of the Textile School at North Carolina State College, Raleigh, N. C. He succeeds Thomas Nelson who recently retired.

Mr. Campbell is a graduate of New Bedford Textile School and, after working in New Bedford mills, was an assistant in cotton research for the Firestone Rubber Co. Subsequently he was an instructor in textile engineering at Clemson College and served with the U. S. Department of Agriculture as a cotton research specialist. He joined the Textile Research Institute last April.

• APPOINTED ASST. SALES MANAGER

A. J. Mease has been appointed assistant sales manager of the Dyestuffs Division at the Boston branch of E. I. duPont de Nemours & Co., Inc. He was formerly in the Rubber Chemicals Department of the duPont company at Wilmington. Mr. Mease is a member of the American Association of Textile Chemists and Colorists.

• ACCIDENTAL DEATHS AND INJURIES

There was an accidental death every six minutes and an injury every three and a half seconds during 1942, the National Safety Council reports in its 1943 edition of "Accident Facts."

Occupational deaths occurred in 1942 at the rate of one every 19 minutes, the Council said, and occupational accidents occurred every 31 seconds. Every 18 minutes someone suffered a fatal accident at home and every seven seconds there was a non-fatal accident in someone's home.

The largest single cause of home deaths was falls, which took a toll of 24,800 lives last year. Burns, drowning, railroad, firearms, poison gas and other poisons were the other major causes of death in 1942.

• REPAIRING ARMY CLOTHING

Millions of articles of Army clothing and equipage are being repaired each month by Quartermaster Corps repair shops in all parts of the world, the War Department announced recently. At present, nearly 3,000,000 articles are being turned out monthly by shops in the continental United States alone.

Quartermaster Corps repair shops handle all articles of clothing and equipage, including such items as tents, blankets, haversacks, canvas, webbing and other textile articles, typewriters and office machines.

Quartermaster shops at approximately 260 posts, camps and stations in the United States are saving the Government nearly $2,000,000 a month through their repair activities. Overseas Quartermaster repair shops are in operation at numerous bases. These fixed installations are supplemented by repair shops on wheels, operating in theaters of operations where it is impracticable to set up permanent establishments.

Articles in excess of the capacity of overseas repair units are returned to the United States for repair or salvage and are handled at newly established repair subdepots on the east and west coasts.

A sub-depot of the Jersey City Quartermaster Depot, established in New York City, rapidly is approaching capacity operation. In a recent two-week period it repaired approximately 160,000 items.

West coast repair operations involving overseas articles are handled by a repair sub-depot of the California Quartermaster Depot at Oakland, where approximately 860,000 articles were turned out in July. Soon to be placed in operation is a repair sub-depot of the Kansas City Quartermaster Depot at St. Joseph, Missouri.

The primary function of repair shops is to renovate worn articles for return to the original user. While minor repairs are the responsibility of the individual soldier, those requiring more skill or the use of machinery are sent to the nearest repair shop. There they are examined carefully. If this examination reveals that the individual item can be repaired satisfactorily, it is put into first-class shape and promptly returned.

All items of clothing, bedding and other articles with which the soldier comes into physical contact are thoroughly laundered or dry cleaned by processes approved by The Surgeon General before any repair work is started.

The repair process involves practically everything except re-dyeing. Clothing, for example, is sewed, supplied with new buttons and even patched, if the patch is in a place that does not show. If the patch will show or if the garment is hopelessly faded it will not be returned for regular wear, but will be put in Class X clothing stocks.

Class X clothing is made up of articles that are serviceable from a wearing standpoint, but which fail to meet Army requirements regarding appearance. Articles of Class X clothing are furnished soldiers in addition to the two regulation uniforms each receives, and are worn during heavy work, maneuvers and on other occasions when unusual wear and tear is likely to occur.

Quartermaster Corps repair shops also turn out substantial volumes of Class B clothing—articles not returned to the original wearer which are added to post or depot stocks for reissue to troops stationed in the United States.

Clothing from overseas goes into either Class B or Class X stocks. Another large source of Class B clothing is that taken from soldiers about to go overseas and replaced by other items.

The repair shops utilize civilian personnel, mostly women. They operate under Army management and control.

• "VATRU-SET" DYEING METHOD

A new method of vat dyeing that is claimed to produce "fool proof" washable rayon fabrics has been developed by the North Carolina Fabrics Corporation of Salisbury, N. C., working in cooperation with technicians of the American Viscose Corporation.

The process, known as "Vatru-Set", reduces costs, and fabrics dyed by this method easily meet the high "green label" washability and colorfastness standards of the American Viscose Corporation's "Crown" Tested Plan. For a washable rayon fabric that can carry the green (washable) "Crown" Tested tag or label, the requirements call for launderability at 160° F., 40 hours Fadeometer light

fastness, and high resistance to both acid and alkaline perspiration.

To accomplish a dyed result to pass these test requirements a vat dye must be used. This would ordinarily call for a vat pigment padding and jig process. In developing the "Vatru-Set" process, however, a new formula was originated and after a number of months of experimental work it is stated that it became evident that the new process was not only commercially practical but also marked a definite and valuable advance in the field of dyeing.

Some of the advantages claimed for the "Vatru-Set" method are that it makes possible the vat dyeing of fabrics that never before could be dyed by the vat dyeing process. These fabrics, which now can be dyed so as to be "fool proof" insofar as colorfastness is concerned, include such popular yet varied fabrics as wool garbardine, viscose rayon shantung, viscose rayon fuji and viscose and acetate rayon challis types. It is said to give dependable results, moreover, when working with difficult colors such as the popular "ice cream" shades, and shirting shades in greens, blues and tans. In addition, it is said to provide definite shrinkage control and full protection against color fading from both acid and alkaline perspiration.

It is stated that the "Vatru-Set" method of vat dyeing is currently being used with marked success on shirting materials and trousers for the armed forces, which are being dyed in the popular shades of tans and pinks.

● PRICES FOR DYED COTTON YARNS

Sellers and commission dyers of dyed cotton yarns were reminded by the Office of Price Administration recently that prices for these yarns and rates for commission dyeings are covered by the General Maximum Price Regulation which, in substance, sets ceilings at the prices at which deliveries were made in March, 1942.

This announcement is made at this time, the OPA said, because it has become apparent that some sellers and dyers, through misinterpretation of Revised Price Schedule No. 7 and Maximum Price Regulation No. 33, have considered that dyed cotton yarn and the commission dyeing of cotton yarns are exempt from price control. These two regulations, which provide maximum prices for combed and cotton yarns, respectively, and for mercerizing and gassing and bleaching, do not apply to dyed yarns or to commission dyeing. However, this does not leave dyed yarns or commission dyeing uncontrolled, OPA emphasized. Dyed yarn sellers and commission dyers must conform their prices to the provisions of the GMPR.

● "E" TO UNION BLEACHERY

Union Bleachery of Greenville, S. C., has achieved the Army-Navy "E" award for its record in war production. The second oldest establishment of its kind in the South, the bleachery has been serving the army, navy and marine corps since the early days of war orders.

The pennant was presented by Lt. Col. Christopher C. Baldwin, Jr., chief of the textile section, procurement division, office of the quartermaster general, Washington. R. W. Arrington, president of the bleachery, accepted on behalf of the company.

In the photograph are shown, left to right: Mrs. Gertrude Floyd Moody, Wofford Cox and W. A. Bishop, employee representatives; Lt. Col. Baldwin, and Mr. Arrington.

● ASST. CHEMICAL DIRECTOR

Appointment of Dr. William Stansfield Calcott to the post of assistant chemical director in charge of development of the Organic Chemicals Department, with offices in Wilmington, Delaware, has been announced by E. I. du Pont de Nemours & Company.

Dr. Calcott, since 1931, has been director of the Jackson Laboratory and the semi-works plant operated at the Du Pont Dye Works, Deepwater, N. J. John Marlin Tinker, assistant director since 1938, has been appointed director of the laboratory and semi-works. Dr. George Edward Holbrook was advanced from head of the New Products Division to assistant director.

Dr. Calcott was honored by 500 employees of the laboratory and works at farewell ceremonies August 28, when a scroll bearing the names of personnel, and gifts, were presented to him.

He joined the staff at the Du Pont Experimental Station, Wilmington, in 1915 after two years with the General Electric Company, Pittsfield, Mass. In 1918 he became assistant division head of the company's General Organic Division and in 1928 was appointed assistant director of Jackson Laboratory.

Among outstanding contributions from the laboratory while Dr. Calcott was director was the translation of the test-tube discovery of neoprene, first general-purpose synthetic rubber made in the world, into terms of commercial production.

Other notable research achievements of the laboratory during this period were: development of a process for the large-scale manufacture of tetraethyl lead; chemicals for the rubber industry; gum inhibitors, lubrication assistants and oil stabilizers for petroleum products; and new, fast dyestuffs for the textile, paper and leather industries.

● SPECTROPHOTOMETER IN CAMOUFLAGE WORK

General Electric's recording spectrophotometer is being used to match camouflage colors so that they cannot be detected by the enemy's infrared cameras.

Camouflaging, an art which depends on the use of color, suffered a major setback when the infrared camera was developed. Infrared light, which is not visible to the human eye, can be photographed on special film. Thus two objects which to the eye have the same color may photograph differently with the special film, due to different amounts of infrared received from them. This means that the camouflage artist cannot judge from the appearance of a color how it will look to the infrared camera.

The spectrophotometer has now come to the aid of the camouflager. It gives him a measure of color—both visible and invisible—which puts him on an equal footing with the infrared camera. For by determining the amount of light of infrared wave lengths that is reflected by any paint or other material he wants to use, he can tell what effect that material or color will have on the plate of the infrared camera.

The spectrophotometer is said to insure perfect matching of colors under all conditions. Colors which appear to the eye to be perfectly matched under one light

may actually be mismatched under another light. But matches made with the spectrophotometer are identical under all lighting conditions. Hence for many manufacturing processes where extremely accurate color matching is required, such as in making textiles, dyes, and paints, the spectrophotometer is a valuable aid.

• APPOINTED GENERAL MANAGER

The appointment of William R. Reiser as general manager, secretary and treasurer of the Lima Woolen Mills Company, Lima, Ohio, effective September 1, was announced recently by W. G. Northup, president of the Lima Woolen Mills Company and of the North Star Woolen Mill Company.

Mr. Reiser, who has spent more than half of this year at the Lima Mill inaugurating new accounting installations and working on methods engineering, was born near Adrian, North Dakota. His managerial and accounting experience has been confined entirely to the textile milling field, and his first position was as comptroller and secretary of the Allen-A Company, manufacturers of hosiery and underwear at Kenosha, Wisconsin. In 1934 he managed a knitting mill in Beloit, Wisconsin, and from 1935 to 1941 was associated with the Strutwear Knitting Company of Minneapolis where he handled special assignments in accounting and methods engineering.

Since December, 1941, he has been chief accountant of the North Star Woolen Mill Company, Minneapolis.

• JOINS HART PRODUCTS

It is announced that William A. Green has joined the technical staff of the Hart Products Corporation and will work with textile manufacturers and processors in connection with their problems in the field of permanent finishes and pigment colors.

After leaving the Rhode Island School of Design (he supplemented his courses with special work at Brown University and Providence College), Mr. Green was in charge of research and development for the Sayles Finishing Plants over a long term of years, also serving as a superintendent in the Glenlyon Print Works Division.

Mr. Green's training and practical experience should prove of value to finishers and processors who are interested in the development of new fabrics . . . a phase of the textile business in which "Kopan"—a Hartex Product—is said to be playing an important part.

• FELT FACTS

"Felt Facts" is a new booklet just issued by The Felt Association, Inc. of New York, and tells the story of the manufacture and of some of the uses of wool felt. It is written in simple, non-technical style for the layman and the various steps in the manufacturing process, about which the average person knows very little, are described and illustrated.

The Felt Association was prompted to issue the booklet because the hundreds of new uses, civilian and military, which have been found for this fabric since the war began have brought many inquiries from a wide range of industries.

Attention is called to its many applications in engineering and mechanical fields as an alternate for rubber, cork, certain fabrics and plastics, and other priority materials. The importance of wool felt in improved technique vibration-isolation, filtering, grinding and polishing, and other processes ranging from minute filters in tiny hypodermic needles to block-buster washers and padding for eighty-ton tanks, is revealed. The modern manufacture of this oldest of fabricated fibre material, is interestingly portrayed in sixteen drawings by the noted artist, Helene Carter.

Copies may be obtained gratis by addressing Korbel & Colwell, Inc., Public Relations Counsel, 480 Lexington Avenue, New York (17) N. Y.

• DR. ROSE RETIRES

Dr. Robert E. Rose has retired after 22 years' service as director of the Technical Laboratory at the Du Pont Dye Works in Deepwater, N. J., to assume new duties as consultant to the laboratory, announces E. I. du Pont de Nemours & Company.

Robert E. Rose

He is succeeded as director by George H. Schuler, of Pedricktown, N. J., connected with the laboratory staff throughout Dr. Rose's tenure as director. Mr. Schuler has held the post of associate director since 1938.

Dr. Miles A. Dahlen is continuing as assistant director. He was appointed in 1939, following eleven years as chemical division head at the Dye Works' Jackson Laboratory.

Recognized as an authority on textile color research, Dr. Rose served on the faculties of St. Andrews University, Scotland, University of Nottingham, England, and University of Washington at Seattle, until 1917 when he joined Du Pont as an organic chemist.

He was honored with a Mellon Institute fellowship in 1917, was president of the American Association of Textile Chemists and Colorists during 1933, 1934 and 1935; held offices in the American Chemical Society, U. S. Institute of Textile Research; and is a member of the Franklin Institute, the American Institute of Chemical Engineers, and the Society of Chemical Industry.

Mr. Schuler, a B. S. from the College of the City of New York, spent four years with the American Dyestuffs and Chemical Works, Newark, before joining Du Pont in 1921. In 1927 he was appointed head of the dyestuffs standardizing laboratory, serving until 1934, when he was named assistant director of the Technical Laboratory.

• SOLUBLE NITROCELLULOSE AVAILABLE

Hercules Powder Company has announced that soluble nitrocellulose is now available to users in the United States as well as abroad without restrictions. On May 14, 1943, Soluble Nitrocellulose General Preference Order M-196 was revoked, permitting purchase without the approval of the War Production Board, but the supply remained limited. Since then, the supply of Hercules nitrocellulose has improved and priority ratings are no longer required.

• POLYVINYL ALCOHOL RESIN

Polyvinyl alcohol resin will be available in large quantities for postwar applications, the Electrochemicals Department of E. I. du Pont de Nemours & Company announced recently.

Said to be characterized by exceptional toughness and resistance to oil, grease and many solvents, this plastic now is employed in hose assemblies for airplanes, trucks, and tanks, oil and grease-resistant aprons and gloves for war workers, printing plates, adhesives, emulsifying agents for waxes, resins, and oils, textile sizes, and a variety of vital military articles.

All polyvinyl alcohol today is allocated by the War Production Board for military and certain critical civilian needs. Polyvinyl

alcohol is a member of the vinyl resin family, which is annually replacing 22,000 tons of crude rubber.

Polyvinyl alcohol was introduced commercially by Du Pont shortly before the war started, after several years of intensive research. Military demands for it have necessitated rapid expansion of production facilities.

As a size this plastic is said to give required protection to the fibers and prevent their breaking during weaving and knitting.

• NEW WPB PUBLICATION

A new publication, designed to aid business men and Government officials in obtaining information on all products, materials, and service handled by the War Production Board will be issued by WPB every four weeks, it was announced recently. The first issue was available the week of September 20th.

The publication, titled "Products and Priorities," will include all information formerly contained in "Priorities" and in "Product Assignments," both of which will be discontinued. A year's subscription of thirteen issues may be obtained for $2.00 from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. Single issues will be available at 20 cents each.

Persons who now subscribe to "Priorities" will receive the new publication for the balance of their regular subscription. "Product Assignments" had not been available for public distribution.

A feature of "Products and Priorities" is a master alphabetical index listing every product, material, or service which comes under WPB supervision or control. This will enable business men and others to determine easily the numbers of any applicable WPB orders and forms, all necessary CMP references, and the WPB Division and section responsible for the product, material, or service.

Formerly, part of this information was included in "Priorities," and part in "Product Assignments," but until now it had not been available in coordinated form.

"Products and Priorities" will also include a list of Claimant Agencies, Claimant Agency program symbols, and, in subsequent issues, other information for which a public need is indicated.

• JOINS REFINED PRODUCTS

Refined Products Company of Lyndhurst, New Jersey, manufacturers of specialty products for the textile and related industries, has announced the appointment of Arthur S. Mueller as technical director of the organization. Mr. Mueller was associated with Refined Products Corporation as chemist from its formation in 1938 until the early part of 1941. At this time he became the chief chemist in the new technical department of the United Merchants and Manufacturers Management Corporation of New York City. Mr. Mueller will assume his new duties about the first of October, 1943.

• FLAG COLORS

At the special request of the Quartermaster General of the War Department, The Textile Color Card Association has just compiled, for the use of this Department, as well as other branches of the Government, a standard reference of the authentic flag colors of all the United Nations and the South American Republics.

The preparation of this collection of flag colors has entailed a vast amount of research on the part of the association, it was stated by Margaret Hayden Rorke, managing director. Authentic historical documents and original colors, supplied to the association by the embassies, legations and other diplomatic representatives of these nations, comprise the authoritative sources of information used for the compilation of this collection of flag color standards.

Every flag color was carefully matched to the colors created by The Textile Color Card Association and samples of the latter, designated by their T.C.C.A. color name, number and issue, were attached to the special book form, with foreword by Mrs. Rorke, prepared for the Quartermaster General's office. The majority of these flag colors are found in the Ninth Edition of the Standard Color Card of America, issued by the association, while others appear in season cards and in the United States Army Color Card, showing the Official Colors for Arms and Services, issued by the association and approved and accepted by the Quartermaster General of the United States Army.

It is expected that this authentic collection of flag colors, in addition to providing accurate data for the Government, will also prove a valuable reference source for the many industries represented in the association's membership. One copy of the book will remain at the Philadelphia Quartermaster Depot and another in the War Department at Washington. A third copy is on file at the Association's headquarters for reference and use by its members.

• JOINS BICK & CO.

David B. Ekstrom, Jr., formerly a chemist with Riverside and Dan River Mills, Danville, Va., is now employed as chemist and colorists by Bick & Co., manufacturing chemists of Reading, Pa.

• CLASSIFIED • ADVERTISEMENTS

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $6.25 per column inch or less per insertion.

POSITION WANTED: As manager, assistant manager or technical advisor in moderate size finishing plant; familiar with all departmental angles as well as requirements of trade. Fully familiar with quartermaster requirements. Complete references. Above draft age. Write Box No. 466, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

WANTED: Graduate Chemist with dyehouse experience for development work in large dyehouse. Applicant must not be engaged in war work and must have sanction of the local War Manpower Commission. Write Box 469, American Dyestuff Reporter, 440 Fourth Ave., New York 16, N. Y.

WANTED: Chemist, having practical manufacturing processes for textile processing specialties, such as synthetic resins, synthetic detergents, cationic softeners, oil specialties of proved commercial value. Unusual opportunity. Full details required. Replies treated confidentially. Write Box No. 473, American Dyestuff Reporter, 440 Fourth Ave., New York, 16, N. Y.

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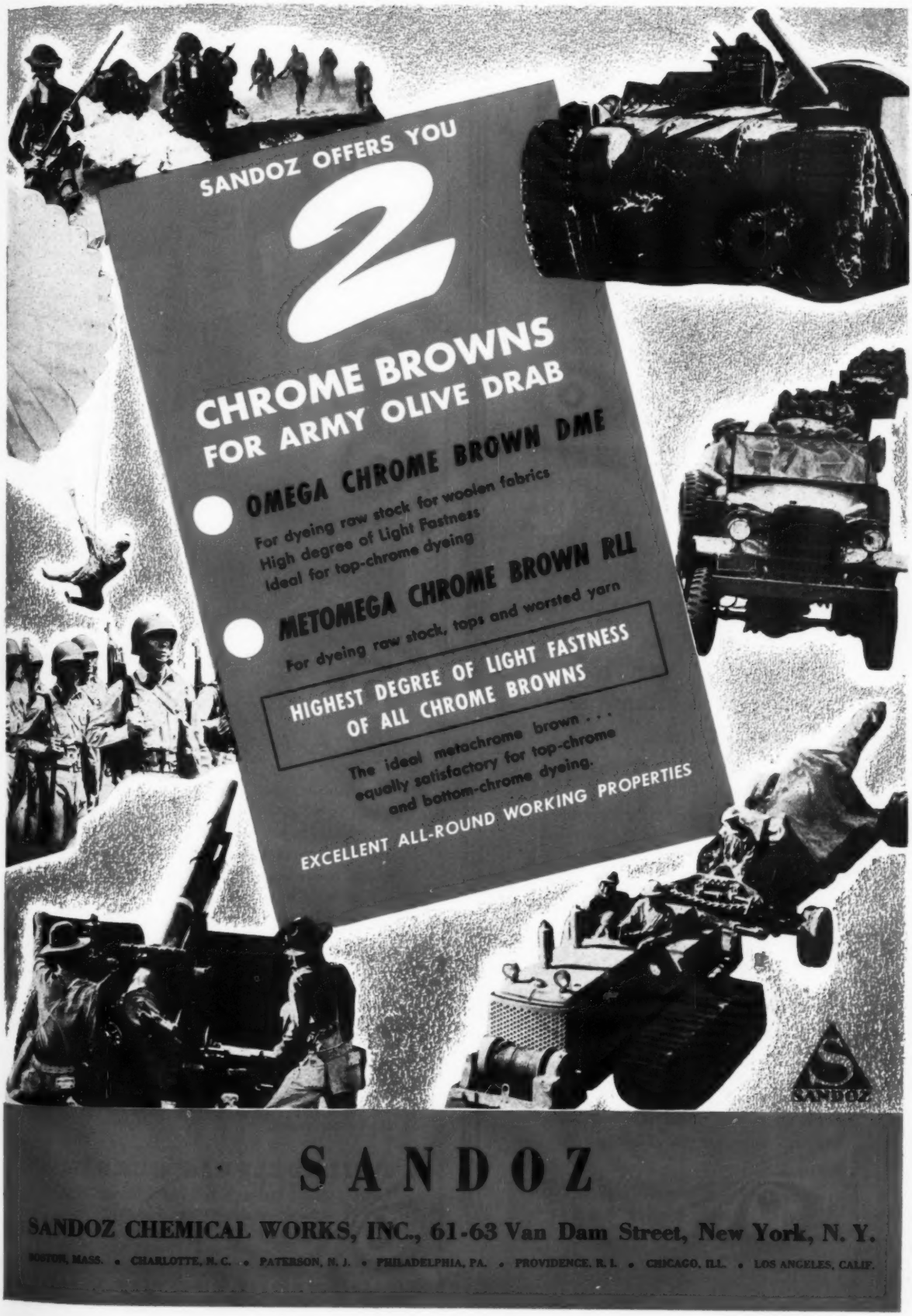
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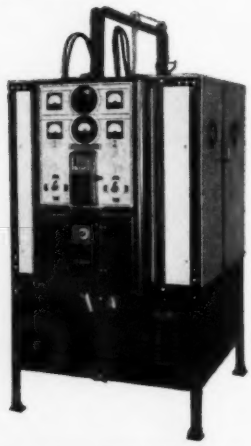

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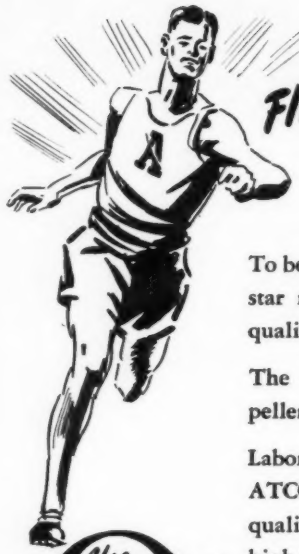

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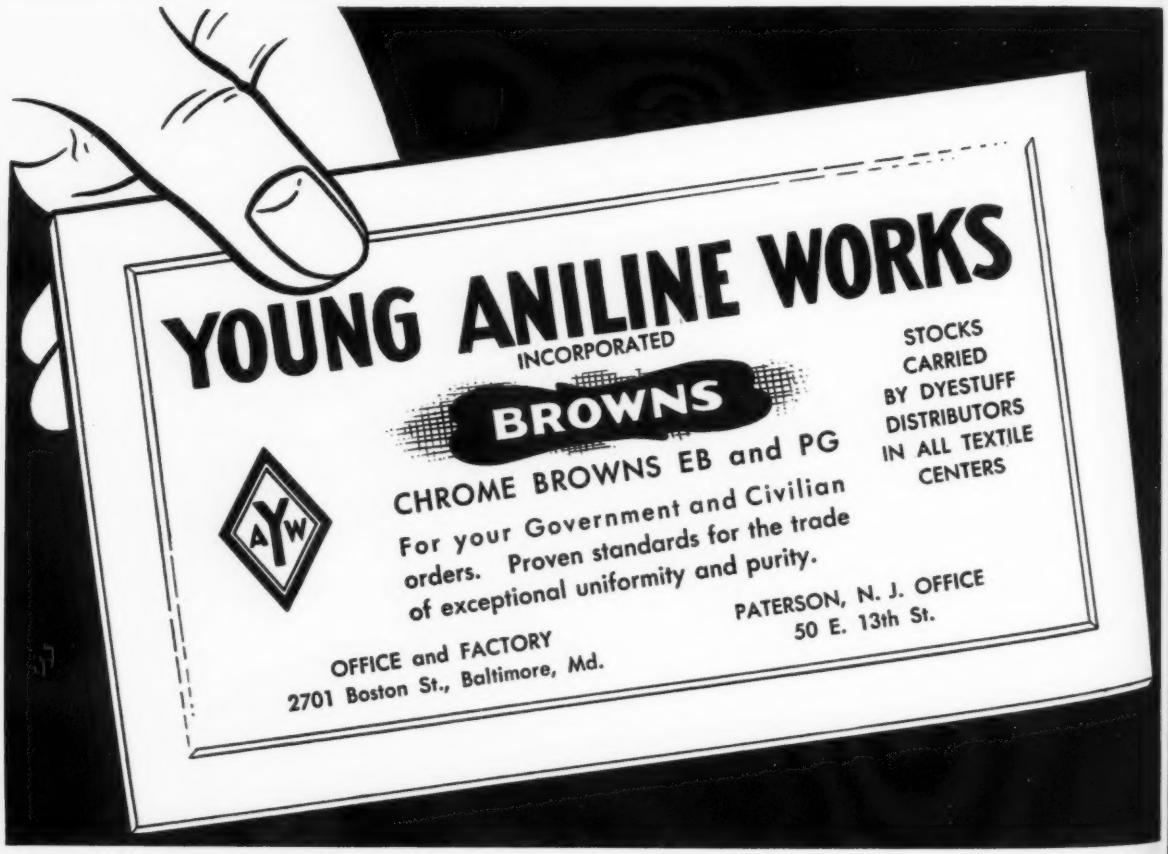
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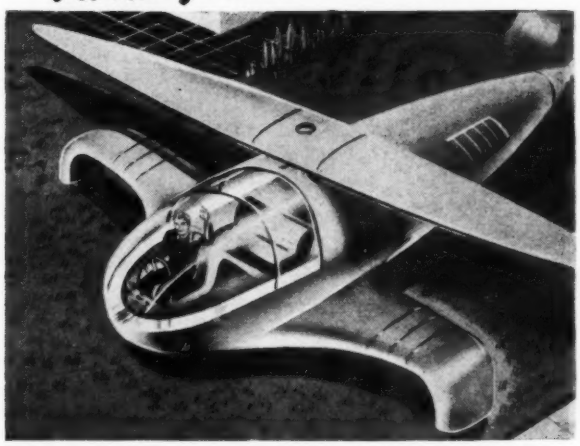

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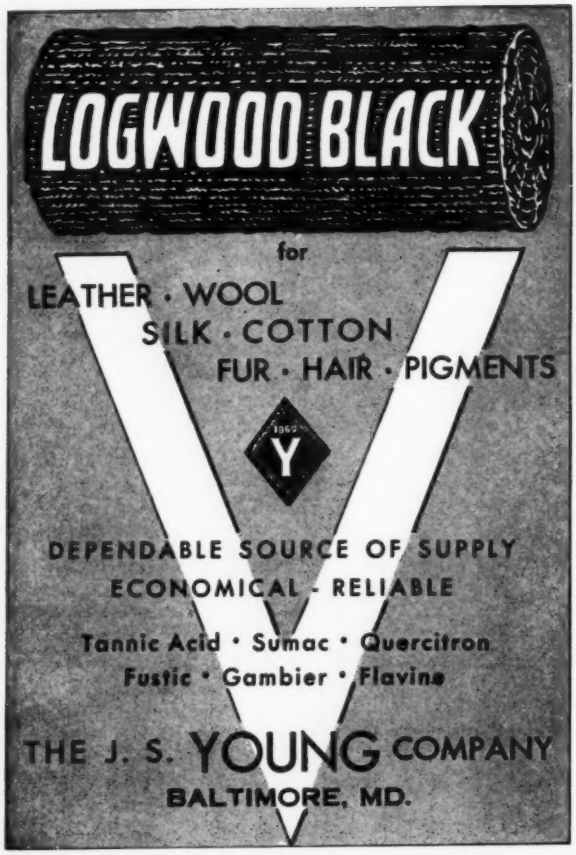

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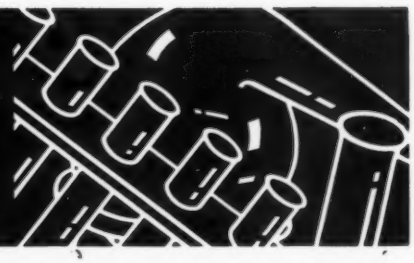

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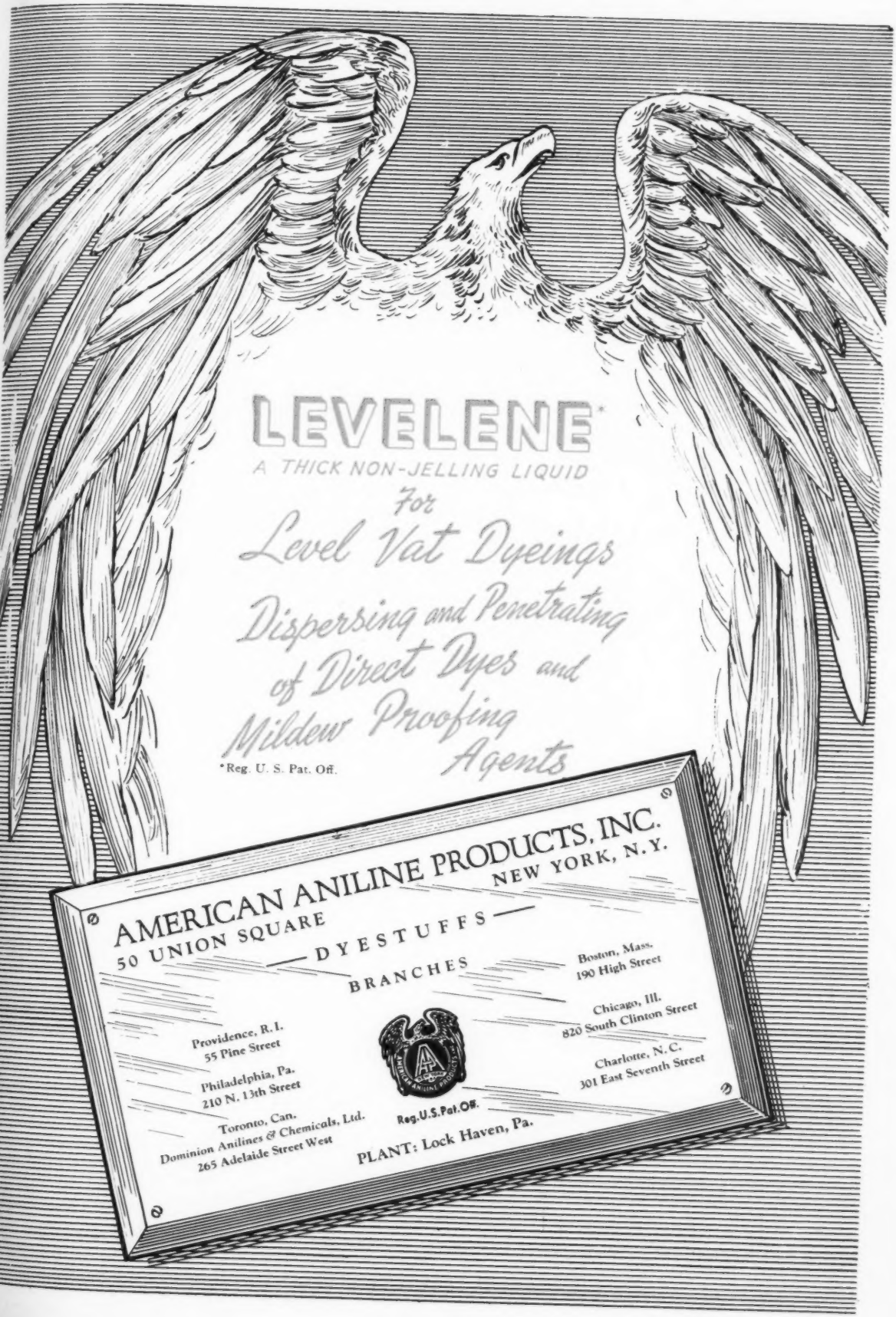
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